°FORM PTO-1390
OFFICE
(REV 11-2000)

U.S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK

ATTORNEY'S DOCKET NUMBER

449122020200

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. § 371

U.S. APPLICATION NO (If known, see 37 CFR 1.5)

10/019064
Not yet assigned

INTERNATIONAL APPLICATION NO	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE00/02102	**June 28, 2000**	**June 29,1999**

TITLE OF INVENTION

PROCESSING A REQUEST TO AN OPERATOR SERVICE

APPLICANT(S) FOR DO/EO/US

Christian HAVLIS et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U S C 371

2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C 371

3. ☐ This is an express request to begin national examination procedures (35 U.S C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below

4. ☒ The US has been elected by the expiration of 19 months from the priority date (PCT Article 31)

5. ☒ A copy of the International Application as filed (35 U.S.C 371(c)(2))
   - a. ☒ is attached hereto (required only if not communicated by the International Bureau).
   - b. ☒ has been communicated by the International Bureau
   - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).

6. ☒ An English language translation of the International Application under PCT Article 19 (35 U.S C 371(c)(2))
   - a. ☒ is attached hereto
   - b. ☒ has been previously submitted under 35 U.S C 154(d)(4).

7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S C. 371(c)(3)).
   - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   - b. ☐ have been communicated by the International Bureau
   - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   - d. ☐ have not been made and will not be made

8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S C. 371(c)(3)).

9. ☐ An oath or declaration of the inventor(s) (35 U.S C. 371(c)(4)).

10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U S.C. 371(c)(5)).
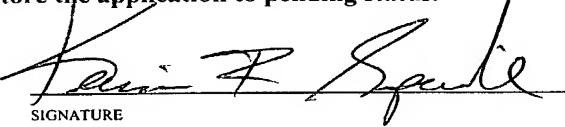
Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1 97 and 1.98.

12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3 31 is included.

13. ☐ A FIRST preliminary amendment.

14. ☐ A SECOND or SUBSEQUENT preliminary amendment.

15. ☐ A substitute specification.

16. ☐ A change of power of attorney and/or address letter

17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U S C 1 821 - 1 825

18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4)

19. ☐ A second copy of the English language translation of the international application under 35 U S C. 154(d)(4)

20. ☒ Other items or information 1) Application Data Sheet; 2)Int'l Search Report; 3) IPER; 4) Return receipt postcard.

CERTIFICATE OF HAND DELIVERY

I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D.C. on December 27, 2001.

Melissa Garton

dc-293242

U.S. APPLICATION NO (if known, see 37 CFR 1 5)	INTERNATIONAL APPLICATION NO	ATTORNEY DOCKET NO
Not yet assigned 10/019064	PCT/DE00/02102	449122020200

21. ☒ The following fees are submitted:

CALCULATIONS PTO USE ONLY

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO...........................$1,000.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO......................$860.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO...........................$710.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provision of PCT Article 33(1)-(4) $690.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00

			ENTER APPROPRIATE BASIC FEE AMOUNT =	$860.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				$0	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	- 20 =		x $18.00	$0	
Independent claims	- 3 =		x $80.00	$0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $270.00	$0	
			TOTAL OF ABOVE CALCULATIONS =	$860.00	
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by ½.				$0	
			SUBTOTAL =	$0	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$0	
			TOTAL NATIONAL FEE =	$0	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00 per property** +				$0	
			TOTAL FEES ENCLOSED =	$860.00	
				Amount to be refunded:	$
				charged:	$

a. ☒ Please charge my **Deposit Account No. 03-1952** (referencing Docket No. 44912-20202.00) in the amount of $860.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

b. ☒ The Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment to **Deposit Account No. 03-1952** (referencing Docket No. 44912-20202.00).

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Kevin R. Spivak
Morrison & Foerster LLP
2000 Pennsylvania Avenue, N.W.
Washington, D.C. 20006-1888

SIGNATURE

Kevin R. Spivak
Registration No. 43,148

December 27, 2001

CERTIFICATE OF HAND DELIVERY
I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D.C. on May 6, 2002.
Melissa Garton
Melissa Garton

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:

   Christian HAVLIS et al.

Serial No.:   10/019,064

Filing Date: December 27, 2001

For: PROCESSING A REQUEST TO AN
        OPERATOR SERVICE

Examiner: Not yet assigned

Group Art Unit: Not yet assigned

PRELIMINARY AMENDMENT

BOX PCT
Commissioner for Patents
Washington, D.C. 20231

Sir:
    Prior to examination on the merits, please amend this application as follows:

In the Claims:

Please cancel claims 1 & 2.

What is claimed is:

3.   (Amended)   The method as claimed in claim 22 , wherein at the beginning of the waiting procedure for the request, an anticipated waiting time is determined and, if it is above a predetermined lower threshold value, the call-back entry is generated, otherwise the request is arranged in sequence in the waiting field.

4.   (Amended)   The method as claimed in claim 22, wherein at the beginning of the waiting procedure for the request concerned, an anticipated waiting time is determined and, if

it is below a predetermined upper threshold value, the call-back entry is generated, otherwise the request is denied.

5. (Amended) The method as claimed in claim 22, wherein before terminating the request or the connection, service-specific instructions are taken from the calling subscriber and used when generating the call-back entry and/or arranging it in sequence.

6. (Amended) The method as claimed in claim 22, wherein at the beginning of the waiting procedure, instructions about the desired type of waiting procedure are taken from the calling subscriber, and a the call-back entry is generated if the instructions include consent of the calling subscriber to a call-back connection.

7. (Amended) The method as claimed in claim 5, wherein the instructions of the calling subscriber are taken in a voice-controlled dialog.

8. (Amended) The method as claimed in claim 22, wherein when an operator or a connection line becomes free, at least one of the first entries in the waiting field is taken from the waiting field, the information of the at least one entry is supplied to the free operator and, on the basis of the information of the entry, the operator calls back the subscriber specified in it.

9. (Amended) The method as claimed in claim 22, wherein the instructions originating from the calling subscriber and concerning an operator selection are used when generating the call-back entry and, when taking an entry, those entries which include the free operator in their operator selection are considered.

10. (Amended) The method as claimed in claim 22, wherein at least one of those entries for which the remaining waiting time is expected to be below a predeterminable threshold value is taken from the waiting field and a call-back connection is initiated.

11. (Amended) The method as claimed in claim 22, wherein the information indicating that an operator or a connection line has become free is transmitted in the direction of the calling subscriber with the aid of the Transaction Capabilities Part Protocol (TCAP), on the

basis of the Signaling System No. 7, the initiation of the call-back connection taking place on the side of the calling subscriber.

12.   (Amended)   The method as claimed in claim 22, wherein the operator service is formed by a number of subscriber lines arranged in the telecommunication network and combined to form a subscriber group.

13.   (Amended)   The method as claimed in claim 12, wherein the subscriber group is connected via a predetermined number of connection lines or connection channels to the telecommunication network.

Please add new claims 14-25 as follows:

14.   (New) The method as claimed in claim 23, wherein at the beginning of the waiting procedure for the request, an anticipated waiting time is determined and, if it is above a predetermined lower threshold value, the call-back entry is generated, otherwise the request is arranged in sequence in the waiting field.

15.   (New) The method as claimed in claim 23, wherein at the beginning of the waiting procedure for the request concerned, an anticipated waiting time is determined and, if it is below a predetermined upper threshold value, the call-back entry is generated, otherwise the request is denied.

16.   (New) The method as claimed in claim 23, wherein before terminating the request or the connection, service-specific instructions are taken from the calling subscriber and used when generating the call-back entry and/or arranging it in sequence.

17.   (New) The method as claimed in claim 23, wherein at the beginning of the waiting procedure, instructions about the desired type of waiting procedure are taken from the calling subscriber, and the call-back entry is generated if the instructions include consent of the calling subscriber to a call-back connection.

18.   (New) The method as claimed in claim 23, wherein when an operator or a connection line becomes free, at least one of the first entries in the waiting field is taken from the waiting

field, the information of the at least one entry is supplied to the free operator and, on the basis of the information of the entry, the operator calls back the subscriber specified in it.

19.   (New) The method as claimed in claim 23, wherein the instructions originating from the calling subscriber and concerning an operator selection are used when generating the call-back entry and, when taking an entry, those entries which include the free operator in their operator selection are considered.

20.   (New) The method as claimed in claim 23, wherein at least one of those entries for which the remaining waiting time is expected to be below a predeterminable threshold value is taken from the waiting field and a call-back connection is initiated.

21.   (New) The method as claimed in claim 23, wherein the information indicating that an operator or a connection line has become free is transmitted in the direction of the calling subscriber with the aid of the Transaction Capabilities Part Protocol (TCAP), on the basis of the Signaling System No. 7, the initiation of the call-back connection taking place on the side of the calling subscriber.

22.   (New) A method of processing requests directed to an operator service of a telecommunication network when the network operators are unavailable, comprising:

generating an entry as a call-back entry with information which includes at least one of a call address concerning a calling subscriber and information representing the calling subscriber and is arranged in sequence in a waiting field, one of the requests or a connection arising from the calling subscriber being terminated; and

establishing a call-back connection between the calling subscriber specified by the call address and an operator or a connection line when an operator or a connection line becomes free, on the basis of the information of the at least one entry wherein at least one of the first entries in the waiting field is taken from the waiting field.

23.   (New) A method of processing requests directed to an operator service of a telecommunication network when the network operators are unavailable, comprising:

generating an entry as a call-back entry with information which includes at least one of a call address concerning a calling subscriber and information representing the calling

subscriber and is arranged in sequence in a waiting field, the requests or a connection arising from the calling subscriber being terminated; and

establishing the call-back connection between the calling subscriber and an operator or a connection line, wherein at least one of the first entries in the waiting field is taken from the waiting field and, on the basis of the information of the entry, a call-back connection directed at the subscriber specified by the call address is initiated and is maintained.

24.   (New) The method of claim 22 wherein the request for connection from a calling subscriber of the network for the operator service, the operator service being assigned a predetermined number of operators and/or connection lines, in which a received request is subjected to a waiting procedure on the part of the operator service if the suitable operators or connection lines for the request are busy.

25.   (New) The method of claim 23 wherein the request for connection from a calling subscriber of the network for the operator service, the operator service being assigned a predetermined number of operators and/or connection lines, in which a received request is subjected to a waiting procedure on the part of the operator service if the suitable operators or connection lines for the request are busy.

In the Abstract:

Please replace the Abstract with the substitute Abstract attached hereto.

REMARKS

Amendments to the specification have been made and are submitted herewith in the attached Substitute Specification. A clean copy of the specification and a marked-up version showing the changes made are attached herewith. The claims and abstract have been amended in the attached Preliminary Amendment. All amendments have been made to place the application in proper U.S. format and to conform with proper grammatical and idiomatic English. None of the amendments herein are made for reasons related to patentability. No new matter has been added.
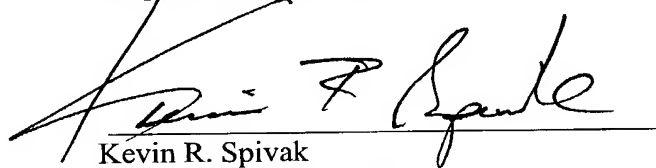
Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Version with markings to show changes made**".

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. 449122020200. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

Dated: May 6, 2002

Kevin R. Spivak
Registration No. 43,148

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<u>VERSION WITH MARKINGS TO SHOW CHANGES MADE</u>

For the convenience of the Examiner, the changes made are shown below with deleted text in strikethrough and added text in underline.

<u>In the Claims:</u>

Please cancel claims 1 & 2.

~~Patent claims~~ **<u>What is claimed is:</u>**

3.   (Amended)   The method as claimed in claim **<u>22</u>** ~~1 or 2, characterized in that,~~ **<u>wherein</u>** at the beginning of the waiting procedure for the request ~~concerned~~, an anticipated waiting time is determined and, ~~provided that~~ **<u>if</u>** it ~~lies~~ **<u>is</u>** above a ~~predeterminable~~ **<u>predetermined</u>** lower threshold value~~(t1)~~, a **<u>the</u>** call-back entry ~~(RRE)~~ is generated, otherwise the request ~~(WTE)~~ is arranged in sequence in the waiting field.

4.   (Amended)   The method as claimed in ~~one of claims 1 to 3, characterized in that,~~ **<u>claim 22, wherein</u>** at the beginning of the waiting procedure for the request concerned, an anticipated waiting time is determined and, ~~provided that~~ **<u>if</u>** it ~~lies~~ **<u>is</u>** below a ~~predeterminable~~ **<u>predetermined</u>** upper threshold value~~(t2)~~, a **<u>the</u>** call-back entry ~~(RRE)~~ is generated, otherwise the request is denied.

5.   (Amended)   The method as claimed in ~~one of claims 1 to 4, characterized in that,~~ **<u>claim 22, wherein</u>** before terminating the request or the connection ~~arising from it~~, service-specific instructions ~~(opw, dat)~~ are taken from the calling subscriber and used when generating the call-back entry and/or arranging it in sequence.

6.   (Amended)   The method as claimed in ~~one of claims 1 to 5, characterized in that,~~ **<u>claim 22, wherein</u>** at the beginning of the waiting procedure, instructions ~~concerning~~ **<u>about</u>** the desired type of waiting procedure are taken from the calling subscriber, and a **<u>the</u>** call-back entry ~~(RRE)~~ is ~~only~~ generated if ~~these~~ **<u>the</u>** instructions include consent of the **<u>calling</u>** subscriber to a call-back connection.

7.   (Amended)   The method as claimed in claim 5 ~~or 6, characterized in that,~~ **wherein** the instructions of the calling subscriber are taken in a voice-controlled dialog.

8.   (Amended)   The method as claimed in ~~one of claims 1 to 7, characterized in that,~~ **claim 22, wherein** when an operator or a connection line becomes free, at least one of the first entries in the waiting field is taken from the waiting field, the information of the at least one entry is supplied to the free operator and, on the basis of the information of the entry, the operator calls back the subscriber specified in it.

9.   (Amended)   The method as claimed in ~~one of claims 1 to 8, characterized in that~~ **claim 22, wherein the** instructions ~~(opw)~~ originating from the calling subscriber and concerning an operator selection are used when generating the call-back entry ~~(RRE), and in that~~ **and**, when taking an entry, ~~only~~ those entries ~~(ent')~~ which include the free operator in their operator selection are considered.

10.   (Amended)   The method as claimed in ~~one of the preceding claims, characterized in that~~ **claim 22, wherein** at least one of those entries for which the ~~still~~ remaining waiting time ~~in the waiting field~~ is expected to be below a predeterminable threshold value~~, or a predeterminable waiting time,~~ is taken from the waiting field and a call-back connection is initiated.

11.   (Amended)   The method as claimed in ~~one of the preceding claims, characterized in that the information representing~~ **claim 22, wherein the information indicating** that an operator or a connection line has become free is transmitted in the direction of the ~~specified~~ **calling** subscriber with the aid of the Transaction Capabilities Part Protocol (TCAP), on the basis of the Signaling System No. 7, the initiation of the call-back connection taking place on the side of the ~~specified~~ **calling** subscriber.

12.   (Amended)   The method as claimed in ~~one of the preceding claims, characterized in that~~ **claim 22, wherein** the operator service is formed by a number of subscriber lines arranged in the telecommunication network and combined to form a subscriber group.

13.   (Amended)   The method as claimed in claim 12, ~~characterized in that~~ **wherein** the subscriber group is connected via a predetermined number of connection lines or connection channels to the telecommunication network.

Please add new claims 14-25 as follows:

14.   (New) The method as claimed in claim 23, wherein at the beginning of the waiting procedure for the request, an anticipated waiting time is determined and, if it is above a predetermined lower threshold value, the call-back entry is generated, otherwise the request is arranged in sequence in the waiting field.

15.   (New) The method as claimed in claim 23, wherein at the beginning of the waiting procedure for the request concerned, an anticipated waiting time is determined and, if it is below a predetermined upper threshold value, the call-back entry is generated, otherwise the request is denied.

16.   (New) The method as claimed in claim 23, wherein before terminating the request or the connection, service-specific instructions are taken from the calling subscriber and used when generating the call-back entry and/or arranging it in sequence.

17.   (New) The method as claimed in claim 23, wherein at the beginning of the waiting procedure, instructions about the desired type of waiting procedure are taken from the calling subscriber, and the call-back entry is generated if the instructions include consent of the calling subscriber to a call-back connection.

18.   (New) The method as claimed in claim 23, wherein when an operator or a connection line becomes free, at least one of the first entries in the waiting field is taken from the waiting field, the information of the at least one entry is supplied to the free operator and, on the basis of the information of the entry, the operator calls back the subscriber specified in it.

19.   (New) The method as claimed in claim 23, wherein the instructions originating from the calling subscriber and concerning an operator selection are used when generating the call-back entry and, when taking an entry, those entries which include the free operator in their operator selection are considered.

20.   (New) The method as claimed in claim 23, wherein at least one of those entries for which the remaining waiting time is expected to be below a predeterminable threshold value is taken from the waiting field and a call-back connection is initiated.

21.   (New) The method as claimed in claim 23, wherein the information indicating that an operator or a connection line has become free is transmitted in the direction of the calling subscriber with the aid of the Transaction Capabilities Part Protocol (TCAP), on the basis of the Signaling System No. 7, the initiation of the call-back connection taking place on the side of the calling subscriber.

22.   (New) A method of processing requests directed to an operator service of a telecommunication network when the network operators are unavailable, comprising:

   generating an entry as a call-back entry with information which includes at least one of a call address concerning a calling subscriber and information representing the calling subscriber and is arranged in sequence in a waiting field, one of the requests or a connection arising from the calling subscriber being terminated; and

   establishing a call-back connection between the calling subscriber specified by the call address and an operator or a connection line when an operator or a connection line becomes free, on the basis of the information of the at least one entry wherein at least one of the first entries in the waiting field is taken from the waiting field.

23.   (New) A method of processing requests directed to an operator service of a telecommunication network when the network operators are unavailable, comprising:

   generating an entry as a call-back entry with information which includes at least one of a call address concerning a calling subscriber and information representing the calling subscriber and is arranged in sequence in a waiting field, the requests or a connection arising from the calling subscriber being terminated; and

   establishing the call-back connection between the calling subscriber and an operator or a connection line, wherein at least one of the first entries in the waiting field is taken from the waiting field and, on the basis of the information of the entry, a call-back connection directed at the subscriber specified by the call address is initiated and is maintained.

24.   (New) The method of claim 22 wherein the request for connection from a calling subscriber of the network for the operator service, the operator service being assigned a predetermined number of operators and/or connection lines, in which a received request is subjected to a waiting procedure on the part of the operator service if the suitable operators or connection lines for the request are busy.

25.   (New) The method of claim 23 wherein the request for connection from a calling subscriber of the network for the operator service, the operator service being assigned a predetermined number of operators and/or connection lines, in which a received request is subjected to a waiting procedure on the part of the operator service if the suitable operators or connection lines for the request are busy.

In the Abstract:

Please replace the Abstract with the substitute Abstract attached hereto.

PROCESSING A REQUEST TO AN OPERATOR SERVICE

ABSTRACT

In the event that operators or connection lines of an operator service of a telecommunication network are busy when a subscriber request (call) is made to said service, a call-back entry (RRE) with information including a call address (trn) of the subscriber is generated and arranged in sequence in a waiting field (WFD). The request or the associated connection is terminated. When an operator or a connection line becomes free, at least one of the first entries (ent, ent') in the waiting field is taken and, on the basis of the information of the entry, a call-back connection is established between the subscriber and the free operator.

1

PROCESSING A REQUEST TO AN OPERATOR SERVICE

CLAIM FOR PRIORITY

5   This application claims priority to International Application No. PCT/DE00/02102 which was filed in the German language on January 4, 2001.

TECHNICAL FIELD OF INVENTION

10   The invention relates to a method of processing requests directed to an operator service of a telecommunication network, and in particular, which are received in the form of a request for connection from a calling subscriber of the network for the operator
15   service.

BACKGROUND OF THE INVENTION

In telecommunication networks, what are known as operator services are typically provided. These
20   services often represent an important link between the customers of the network and the network operators. The tasks of such an operator service are many and varied. A main task, for example, is to provide the subscribers with information on request. A subscriber
25   wishing to use an operator service requests the setting up of a connection to the operator service, for example in a telephone network in the form of a call by means of a service number assigned to the operator service. On the part of the operator service, the request for
30   connection is accepted and the desired service is provided for the calling subscriber.

Also known in current communication networks or telephone networks, along with the connection of
35   private branch exchanges to public exchanges, is the interconnection of a number of subscriber lines arranged in the telephone network to form a subscriber group, for example performing the function of an

operator service - also known as a "hunting group". A hunting group is assigned a group call number or pilot call number, which is shared by all of the interconnected subscriber lines. After it has been

5   dialed - for example for the setting up of a communication link to one of the communication devices assigned to the group - a free subscriber line within the group is determined with the aid of a defined search method - also referred to as a "hunting

10   algorithm" - for setting up the connection.

For example, a subscriber may call an operator service in an ISDN network in order to request information and a connection concerning another subscriber. The

15   subscriber is assigned to a free operator and obtains from the latter the requested service, for example the desired information. The responsible operator can then, if necessary, access a database for example, the operator then being provided on the screen of his PC

20   with information concerning the other subscriber. If also desired, the operator can set up a connection with the desired subscriber and put the latter through to the calling subscriber. The example just described is intended to represent only one of the possibilities or

25   tasks of an operator service.

A system for carrying out an operator service comprises not only a central control system but also the assigned operators. The control system and the operators are

30   usually stationed at 'call centers', and their respective equipment, comprising a terminal, PC, screen etc. and referred to usually and hereafter as a "console", is directly connected or configured for connection to the system. For example, a call center

35   may be established as part of one of the applicant's EWSD switching systems, the operators being connected as network subscribers. Another known embodiment of a call center is set up for example in the central

station of a branch exchange, the operators or the subscribers assigned to the operator service being reachable via extensions. The branch exchanges are connected via a predetermined number of connection
5   lines or transmission channels to the higher-level or public communication network.

Since the number of operators of a given operator service is limited, typically for reasons of economy,
10 there is often the situation - at peak times - that all the available operators are already busy attending to calling subscribers. Consequently, when another subscriber calls for the operator service, no operator is free to take the call. Since in such a case the
15 request is usually not handled like a request for connection to a busy line - that is rejection with a busy signal of the telecommunication network - a waiting procedure is provided for the request received.

20 A conventional method for a waiting procedure, in particular in the case of telephone services, consists of the request or the call being made to wait on-line; the calls waiting on-line are taken by operators one after the other. The calling subscriber must remain on
25 the phone for the entire time until his call is taken. Owing to long waiting times, the call is often terminated prematurely by the often irritated subscriber. This may lead to a lack of acceptance of the service and, as a consequence, to actual
30 dissatisfaction on the part of the customers with the operator of the service.

Another solution is to reduce the waiting time at especially busy times by assigning additional operators
35 to the service. However, apart from the associated administrative effort, this solution requires an adequately large number of operator personnel to be available.

Within current telephone networks, the signaling for setting up and clearing down 64 kbit user information connections for controlling ISDN services takes place
5   on the basis of the ITU-T Signaling System No. 7 - also referred to as SS No. 7.

The actual task of the Signaling System No. 7 is to exchange signaling messages within the communication
10   networks. The signaling messages are exchanged by the user parts within the reference model. According to the type of signaling messages, a distinction is made, for example, between the Telephone User Part - TUP -, the Data User Part - DUP -, the ISDN User Part - ISUP -
15   and the Broadband ISDN User Part - B-ISUP. The TUP was implemented as the first application in the Signaling System No. 7.   Building on the TUP, the ISUP was defined for generally establishing the ISDN and for establishing the signaling within the ISDN. The ISUP
20   gave rise to the latest application of the B-ISUP for applications within ATM-based networks. The main tasks of the ISUP are:

- setting   up   and   clearing   down . user   information
25   connections,
- performing the signaling for service attributes,
- coupling two "logical" signaling connections (for example at the transition from the national network to the international network).
30
The ISDN user part directly uses the Message Transfer Part - MTP - and the Signaling Connection and Control Part - SCCP, layer 4; the ISUP itself is consequently to be classified as belonging to layers 4 to 7 in the
35   OSI reference model. The ISDN user part controls both the link-by-link signaling to reach the destination and the end-to-end signaling relationship between the originating exchange and the destination exchange.

With the aid of the link-by-link signaling, the path for the user information connection and the signaling connection is sought and, after corresponding commands, is set up. The MTP is used for this purpose. For the user information connection, all the involved exchanges must be informed, for example by switching through the user information channel, while only the originating and destination exchanges exchange signaling information for the control of the service attributes. For the end-to-end signaling, the ISUP uses the services of the SCCP. In the ISDN user part, the actual signaling information is exchanged. All the lower-level layers ensure that this information is transmitted in an acknowledged form and reaches the addressed user part. For the exchange of the end-to-end signaling messages for handling ISDN service attributes, the end-to-end signaling of the SCCP is used, based on a TCAP dialog.

For more complex applications within communication networks, such as for example for supporting database inquiries pertaining to services of the Intelligent Network - also referred to as IN - or in the case of mobile radio applications, the Transaction Capabilities Application Part - TCAP - was introduced into the Signaling System No. 7. For example, with the freephone service of the Intelligent Network, the initiator of the connection dials an IN call number (0130 or 0800), which, by calling up the Intelligent Network, determines a destination call number on the basis of the customer parameters. For determining the valid destination call number, only signaling messages have to be exchanged; the user information channel is not connected to the IN. This service call is an example of a typical TCAP application. In the communication of TCAP entities, a distinction is made between structured dialog and unstructured dialog. In the case of structured transport, before messages are

exchanged, a transaction relationship is initiated and the transaction code - also referred to as the transaction ID - is allocated in both communication devices of the two signaling nodes involved for the

5   identification of this relationship.   After a BEGIN message, in the structured dialog the individual information is transferred with CONTINUE messages.   The BEGIN message contains the transaction code of the initiator, the CONTINUE messages contain, depending on

10 the direction of transmission, the code of the initiator or the code of the communication partner as the originating code and the code of the communication partner as the destination code.   Once the information has been transmitted, the dialog is ended in the normal

15 way by the END message.   Structured dialog is used for example for database inquiries, such as for example in the mobile radio networks or in the IN; all exchanged messages can be identified as belonging to this activity by the transaction code.

20

SUMMARY OF THE INVENTION

The invention discloses a waiting procedure in which, with reasonable expenditure and also with a predetermined number of operators, the waiting time of

25 calling subscribers is passed in a more acceptable way than in the case of the known methods.

The invention is achieved in one embodiment by a method in which the waiting procedure to which a request is

30 subjected is carried out according to the invention as follows:

an entry is generated as a call-back entry with information which contains a call address concerning the calling subscriber and/or information representing

35 the calling subscriber and is arranged in sequence in a waiting field, the request or a connection arising from it being terminated, and when an operator or a connection line becomes free, at least one of the first

entries in the waiting field is taken from the waiting field and, on the basis of the information of the at least one entry, a call-back connection is established between the subscriber specified by the call address 5 and the free operator or the free connection line.

The calling subscriber can leave his request to use the service without having to "hang on" during the entire waiting time. In addition, the call charges which 10 would arise during this waiting time do not apply.

According to another embodiment of the method according to the invention, the waiting procedure is carried out as follows:
15 An entry is generated as a call-back entry with information which contains a call address concerning the calling subscriber and/or information representing the calling subscriber and is arranged in sequence in a waiting field, the request or a connection arising from 20 it being terminated.

At least one of the first entries in the waiting field is taken from the waiting field and, on the basis of the information of the entry, a call-back connection 25 directed at the subscriber specified by the call address is initiated and is possibly maintained. Subsequently, the call-back connection is established between the specified subscriber and a free subscriber or a free connection line. In this implementational 30 variant, possibly occurring waiting times for the operators are avoided, since the waiting subscriber is called back already before an operator actually becomes free and, if need be, is connected to an announcement. When a suitable operator becomes free, the already 35 called-back subscriber is immediately put through.
In still another embodiment of the invention, at the beginning of the waiting procedure for the request concerned, an anticipated waiting time is determined

and, provided that it lies above a predeterminable lower threshold value, a call-back entry is generated, otherwise the request is arranged in sequence in the waiting field. This avoids the generation of a call-

5   back in the case of short waiting times, when the subscriber is quite willing to wait.

In addition if, at the beginning of the waiting procedure for the request concerned, an anticipated

10   waiting time is determined and, provided that it lies below a predeterminable upper threshold value, a call-back entry is generated, otherwise the request is denied. This procedure is useful wherever the waiting time would become so great, for example several hours,

15   that waiting for the call-back would presumably be onerous or pointless for the subscriber.

It is preferable if, before terminating the request or the connection arising from it, service-specific

20   instructions are taken from the calling subscriber and used when generating the call-back entry and/or arranging it in sequence.

Service-specific instructions may in this case be, for example, the selection of an operator group, such as

25   for example for a subservice (for example division of the foreign information service into subservices corresponding to geographical areas); they may concern special service features, such as for example a language desired by the subscriber for the services

30   provided or a customer number of the calling subscriber, which could be used for example in the selection of an operator. The instructions may have been provided by the subscriber in a connection arising from the request, for example in an automated inquiry

35   or as a suffix of the service call number dialed by the subscriber.

Furthermore, it is preferable if, at the beginning of the waiting procedure, instructions concerning the desired type of waiting procedure are taken from the calling subscriber, and a call-back entry is only
5 generated if these instructions include consent of the subscriber to a call-back connection.

At the same time, to increase operating convenience, it is preferable if the instructions of the calling
10 subscriber are taken in a voice-controlled dialog.

In yet another embodiment of the invention, more flexible handling of the call-back can be achieved if, when an operator becomes free, the first entry in the
15 waiting field is taken from the waiting field, the information of the entry is supplied to the free operator and, on the basis of the information of the entry, the operator calls back the subscriber specified in it. The operator may initiate the call-back by
20 pressing a button for example, whereupon the call-back connection is established, or the call-back connection is produced automatically by the console, without confirmation by the operator.

25 The instructions originating from the calling subscriber and concerning an operator selection are additionally used when generating the call-back entry, and, when taking an entry, those entries which include the free operator in their operator selection are
30 considered. The instructions may be taken from the subscriber, for example as mentioned further above, or have been provided as a suffix of the call number dialed by the subscriber.

35   BRIEF DESCRIPTION OF THE DRAWINGS
The invention together with further benefits is explained in more detail below on the basis of a non-restrictive exemplary embodiment, which concerns an

operator service of a fixed telephone network. Used as
a basis for this explanation are the attached figures,
which show schematic representations and in which:

5   Figure 1 shows the switching system for carrying out
the operator service with the assigned operators.

Figure 2 shows the waiting field of the operator
service.

10

Figure 3 shows a flow diagram of the generation of an
entry of the waiting field.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

15 An exemplary switching system OPS is shown in figure 1,
on which the operator service is operated. The consoles
of the operators OP1, OP2, OP3 assigned to the operator
service OPS and the network subscribers TN1,
TN2,...,TNx are connected into the fixed telephone
20 network via subscriber lines and line trunk groups (not
represented in the drawing), for example connected as
shown to the switching unit KPN of the exchange. In
the example, three operators are assigned to the
operator service. Of course, there may be any desired
25 number of operators. Provided for controlling the
switching system OPS is a coordination processor COP,
which also undertakes the assignment to the operators
OP1, OP2, OP3 of the subscribers TNx calling with a
service request.

30

A subscriber TNx wishing to use the operator service
OPS requests this service by dialing a service call
number which is assigned in the telephone network to
the operator service. The request for connection
35 received by the operator service consequently
represents a service request. If one of the operators
OP1, OP2, OP3 is free, the request is answered by the

request for connection being put through by the coordination processor COP to the free operator.

However, for purposes of this example, it will be
5 assumed that all the operators OP1, OP2, OP3 are busy attending to service requests from subscribers - not shown in figure 1. Further service requests therefore cannot be handled immediately. Instead, they are subjected to a waiting procedure by the coordination
10 processor COP. In known systems, for example, a recording, for example with the announcement "please wait", is played to the subscriber, and the request concerned is arranged in sequence in a waiting field WFD, usually at the end of the line created by the
15 waiting field WFD. When an operator becomes free, the first request is taken from the waiting field and the subscriber is connected to the free operator.

According to the invention, it is provided that the
20 waiting procedure is carried out on the basis of a request from a subscriber TNx for a (currently) busy operator service OPS as follows: an entry which is generated from call-relevant data of the subscriber TNx is arranged in sequence in the waiting field and the
25 request for connection of the subscriber is terminated. The service request is answered by a separate call-back, which is initiated from the operator system when an operator becomes free on the basis of the call-relevant data in the first entry.
30
Figure 2 shows by way of example a waiting field WFD according to the invention with several entries, which are also referred to hereafter as call-back entries RRE. In the example shown, a call-back entry in each
35 case includes a call number trn of the subscriber, from the service request of which the call-back entry originates. The call number trn serves as a call address when the subscriber is called back. A second

field opw of the entry designates a selection of the desired operators, for example for a desired language, for special subservices or the like. For the sake of simplicity, in figure 2 the operator selections opw in

5 the entries are symbolized by figures, which relate to the number of the operators OP1, OP2, OP3. Additional information data included in an entry concerns additional data which have been provided by the subscriber on the basis of the operator service used.

10

Referring to the flow diagram of figure 3, if a request received by the operator service OPS as a result of a call of a subscriber TNx cannot be answered because the operators OP1, OP2, OP3 are busy, an automated dialog

15 is first conducted with the subscriber, asking the calling subscriber to give service-specific instructions, for example for a subservice desired by the subscriber or desired service features, such as for instance a preferred language. The instructions are

20 stored in a data field dat when an entry is generated and/or used for determining an operator selection opŵ, which indicates which of the operators OP1, OP2, OP3 is to answer the entry.

25 The anticipated waiting time before an answer can be given is then determined. This waiting time is determined by a predetermined method of a known type, for example on the basis of how busy the operator service is, in particular the number of requests

30 waiting, and the processing time of previous service requests. If the anticipated waiting time lies below a predeterminable lower threshold value, for example below 2 minutes, the request is held in the known way as a waiting entry WTE in the waiting line, the calling

35 subscriber TNx being informed by means of an automated announcement that his call will be dealt with shortly.

If, however, the anticipated waiting time exceeds the threshold value, a waiting procedure by means of a call-back takes place. A call-back entry RRE is generated using the call number tnx of the subscriber

5   TNx and arranged in sequence in the waiting field WFD. The subscriber then receives an automated announcement that his request has been registered and he will be called back. Preferably, he may be additionally informed of the anticipated waiting time. The

10 connection is subsequently terminated.

The arrangement in sequence rrh of the call-back entry generally takes place at the end of the waiting field. In special cases, an entry may also be arranged at some

15 other position in the sequence, the position being determined for example on the basis of the subscriber data and the existing entries of the waiting list. For example, it could be provided that a specific group of callers is given preferential treatment and their

20 requests or call-back entries are therefore arranged in sequence ahead of entries of other callers.

In addition to or instead of the already mentioned lower threshold value t1, a second, upper threshold

25 value t2 may be provided. If the anticipated waiting time lies above the upper threshold value t2, for example over 3 hours, incoming service requests are denied, for example with an announcement which informs the subscriber that the service is busy and asks him to

30 call back at a later time, and the creation of an entry for the waiting field does not occur.

In a variant (not represented in figure 3) of the invention, the decision with respect to the type of

35 waiting procedure can be left to the calling subscriber. For example, the subscriber is informed in a voice-controlled dialog of the position in which he would be waiting in line and/or the probable waiting

time and is given the option of waiting in line, being
called back or ending the call without any further
action.

5   If one of the operators of the service OPS becomes
free, for example the operator OP3, a suitable entry is
taken from the waiting field WFD and answered. It may,
for example, always be the first entry in the waiting
field that is taken ent (figure 2). The waiting field
10   WFD is advantageously searched through, beginning from
the first position, for an entry which includes the
free operator in its operator selection opw, and this
entry is taken and used as a basis for the answer ent'.

15   In this example, the first entry with an operator
selection which includes the operator OP3 (represented
in figure 2 by the figure assigned to this operator,
that is 3) is that entry with the call number tn3 of
the subscriber TN3.   (It is coincidental that the
20   number of the operator is the same as that of the
subscriber.) This entry is then taken from the waiting
field and the information of the entry is supplied to
the free operator OP3.   On the basis of this
information, the operator calls the subscriber TN3
25   back, for example by pressing a button on the console,
whereby the establishment of a connection is initiated
in a known way, and in this way offers the subscriber
the desired service.   In a variant, the call-back
connection may be established automatically by the
30   operator console and provided to the operator together
with the information of the call-back entry.

To avoid waiting times for the operators, not only the
entry position which is first in the waiting field but
35   also the penultimate entry or a number of entries
positioned   first   in   the   waiting   field   are
advantageously taken from the waiting field and a call-
back connection set up for each of them.   Those entries

for which the still remaining waiting time within the
waiting procedure is expected to be below a
predeterminable threshold value, or a predetermined
waiting time, are advantageously taken from the waiting

5   field.   The called-back subscribers are, for example,
played an appropriate announcement, by which the end of
the waiting procedure is indicated and the subscriber
is switched through as soon as possible to the desired
operator or subscriber.

10

The initiation according to the invention of a call-
back connection to a specified subscriber as part of a
waiting procedure provided in relation to an operator
service represents in principle an advantageous

15   development of the ISDN-specific "Call Completion on
Busy Subscriber" service feature - also referred to as
"CCBS" - specified according to the ETSI standard - cf.
ETS 300 357 -, which however can be used for one
subscriber line in each case.

20

The "Call Completion on Busy Subscriber" service
feature is one of the most complex service features
within ISDN-specific telephone networks.   In the case
of this service feature, a calling subscriber

25   encountering a busy B subscriber line can have an
automatic call-back initiated by the network when this
subscriber is free again.   In signaling terms, the
unsuccessful connection to the B subscriber is
initially terminated.   In the destination exchange, the

30   call-back request is then entered, it being determined
by the destination exchange when the B subscriber is
free again or has the free status.   The determination
of the free status can be achieved for example by
regularly checking the switching status of the B

35   subscriber.   Alternatively, the transition of the
subscriber status from "busy" to "free" may be selected
or set as the triggering criterion for the initiation
of the call-back.   When the free status of the B

subscriber is established, it is firstly checked whether the A subscriber is likewise free, then the latter is called and after that a connection to the B subscriber is set up. The handling of the service 5 feature - i.e. the checking of the B subscriber and the notification of the A subscriber - takes place as an end-to-end signaling between the two subscriber exchanges. The control of the service feature is supported for this on the SCCP end-to-end signaling 10 connections and uses a TCAP-based dialog for the exchange of the end-to-end signaling data.

The method according to the invention represents a further development of the CCBS standard, the same 15 procedures as CCBS being used for the signaling of the call-back information from the B subscriber to the A subscriber - i.e. the setting up of SCCP end-to-end signaling connections and exchange of end-to-end signaling data by means of TCAP dialog. By contrast 20 with CCBS, other triggering criteria can be used in the case of the method according to the invention. With the aid of the method according to the invention, call-back connections can be created as part of a waiting procedure, it being possible to use for example the 25 finding that the waiting time within a waiting line is less than expected as a triggering criterion for the initiation of a call-back connection. A service feature created in this way, i.e. initiation of a call-back to a specified subscriber if a waiting time is 30 less than that predetermined, can also be referred to as "Call Completion on Dequeuing" or "CCDQ".

The method according to the invention may be used advantageously in the case of subscriber lines or 35 connection lines arranged network-wide within a telephone network and combined to form a subscriber group. The subscriber group may be connected via a predetermined number of connection lines or

transmission channels - for example via a private branch exchange - to the public telecommunication network.

~~Description~~

PROCESSING A REQUEST TO AN OPERATOR SERVICE

CLAIM FOR PRIORITY

5 This application claims priority to International Application No. PCT/DE00/02102 which was filed in the German language on January 4, 2001.

TECHNICAL FIELD OF INVENTION

10 The invention relates to a method of processing requests directed to an operator service of a telecommunication network**, and in particular,** which are ~~respectively~~ received in the form of a request for connection from a calling subscriber of the network for

15 the operator service~~, the operator service being assigned a predetermined number of operators and/or connection lines, in which method a received request is subjected to a waiting procedure on the part of the operator service if all the suitable operators or~~

20 ~~connection lines for this request are busy.~~**.**

BACKGROUND OF THE INVENTION

In telecommunication networks, ~~in particular in telephone networks,~~ what are known as operator services

25 are **typically** provided~~,~~**.** **These services** often ~~representing~~ **represent** an important link between the customers of the network and the network operators. The tasks of such an operator service are many and varied~~; a.~~ **A** main task, for example, is to provide the

30 subscribers with information on request. A subscriber wishing to use an operator service requests ~~in the telecommunication network concerned~~ the setting up of a connection to the operator service, for example in a telephone network in the form of a call by means of a

35 service number assigned to the operator service~~; on.~~ **On** the part of the operator service, the request for connection is accepted and the desired service is provided for the calling subscriber.

Also known in current communication networks or telephone networks, along with the connection of private branch exchanges to public exchanges, is the

5   interconnection of a number of subscriber lines arranged ~~int~~ **in** the telephone network to form a subscriber group, for example performing the function of an operator service - also known as a "hunting group". A hunting group is assigned a group call

10   number or pilot call number, which is shared by all **of** the interconnected subscriber lines~~, and, after~~. **After** it has been dialed - for example for the setting up of a communication link to one of the communication devices assigned to the group - a free subscriber line

15   within the group is determined with the aid of a defined search method - also referred to as a "hunting algorithm" - for setting up the connection.

For example, a subscriber may call an operator service

20   in an ISDN network in order to request information and a connection concerning another subscriber. The subscriber is assigned to a free operator and obtains from the latter the requested service, for example the desired information. The responsible operator can

25   then, if necessary, access a database for example, the operator then being provided on the screen of his PC with information concerning the other subscriber. If also desired, the operator can set up a connection with the desired subscriber and put the latter through to

30   the calling subscriber. The example just described is intended to represent only one of the possibilities or tasks of an operator service.

A system for carrying out an operator service comprises

35   not only a central control system but also the assigned operators. The control system and the operators are usually stationed at 'call centers', ~~as they are known,~~ and their respective equipment, comprising a

terminal, PC, screen etc. and referred to usually and hereafter as a "console", is directly connected **or configured for connection** to the system~~, or can be connected to it~~. For example, a call center may be
5 established as part of one of the applicant's EWSD switching systems, the operators being connected as network subscribers. Another known ~~embodiments~~ **embodiment** of a call center is set up for example in the central station of a branch exchange, the operators
10 or the subscribers assigned to the operator service being reachable via extensions. The branch exchanges are connected via a predetermined number of connection lines or transmission channels to the higher-level or public communication network.
15

Since the number of operators of a given operator service is limited, ~~in particular~~ **typically** for reasons of economy, there is often the situation - ~~in particular~~ at peak times - that all the available
20 operators are already busy attending to calling subscribers ~~and consequently,~~. **Consequently,** when ~~a further~~ **another** subscriber calls for the operator service, no operator is free to take the call. Since in such a case the request is usually not ~~to be~~ handled
25 like a request for connection to a busy line - that is rejection with a busy signal of the telecommunication network ~~-~~ a waiting procedure is provided for the request received.

30 A ~~known and widely customary~~ **conventional** method for a waiting procedure, in particular in the case of telephone services, consists ~~in that~~ **of** the request or the call ~~is~~ **being** made to wait ~~in~~ **on-**line; the calls waiting ~~in~~ **on-**line are taken by operators one after the
35 other. The calling subscriber must remain on the phone for the entire time until his call is taken. Owing to long waiting times, the call is often terminated prematurely by the -**often** irritated -subscriber~~, this~~.

3

This may lead to a lack of acceptance of the service and, as a consequence, to actual dissatisfaction on the part of the customers with the operator of the service.

5   Another ~~attempted~~ solution is to reduce the waiting time at especially busy times by assigning ~~further~~ **additional** operators to the service ~~concerned for a short time~~. However, apart from the associated administrative effort, this solution requires ~~in~~
10 ~~principle that~~ an adequately large number of operator personnel ~~are~~ **to be** available.

Within current telephone networks, the signaling for setting up and clearing down 64 kbit user information
15 connections for controlling ISDN services takes place on the basis of the ITU-T Signaling System No. 7 - also referred to as SS No. 7.

The actual task of the Signaling System No. 7 is to
20 exchange signaling messages within the communication networks. The signaling messages are exchanged by the user parts within the reference model. According to the type of signaling messages, a distinction is made, for example, between the Telephone User Part - TUP -,
25 the Data User Part - DUP -, the ISDN User Part - ISUP - and the Broadband ISDN User Part - B-ISUP. The TUP was implemented as the first application in the Signaling System No. 7. Building on the TUP, the ISUP was defined for generally establishing the ISDN and for
30 establishing the signaling within the ISDN. The ISUP gave rise to the latest application of the B-ISUP for applications within ATM-based networks. The main tasks of the ISUP are:

35 - setting up and clearing down user information connections,
    - performing the signaling for service attributes,

4

- coupling two "logical" signaling connections (for example at the transition from the national network to the international network).

5 The ISDN user part directly uses the Message Transfer Part - MTP - and the Signaling Connection and Control Part - SCCP, layer 4; the ISUP itself is consequently to be classified as belonging to layers 4 to 7 in the OSI reference model. The ISDN user part controls both
10 the link-by-link signaling to reach the destination and the end-to-end signaling relationship between the originating exchange and the destination exchange. With the aid of the link-by-link signaling, the path for the user information connection and the signaling
15 connection is sought and, after corresponding commands, is set up. The MTP is used for this purpose. For the user information connection, all the involved exchanges must be informed, for example by switching through the user information channel, while only the originating
20 and destination exchanges exchange signaling information for the control of the service attributes. For the end-to-end signaling, the ISUP uses the services of the SCCP. In the ISDN user part, the actual signaling information is exchanged. All the
25 lower-level layers ensure that this information is transmitted in an acknowledged form and reaches the addressed user part. For the exchange of the end-to-end signaling messages for handling ISDN service attributes, the end-to-end signaling of the SCCP is
30 used, based on a TCAP dialog.

For more complex applications within communication networks, such as for example for supporting database inquiries pertaining to services of the Intelligent
35 Network - also referred to as IN - or in the case of mobile radio applications, the Transaction Capabilities Application Part - TCAP - was introduced into the Signaling System No. 7. For example, with the

freephone service of the Intelligent Network, the initiator of the connection dials an IN call number (0130 or 0800), which, by calling up the Intelligent Network, determines a destination call number on the

5 basis of the customer parameters. For determining the valid destination call number, only signaling messages have to be exchanged; the user information channel is not connected to the IN. This service call is an example of a typical TCAP application. In the

10 communication of TCAP entities, a distinction is made between structured dialog and unstructured dialog. In the case of structured transport, before messages are exchanged, a transaction relationship is initiated and the transaction code - also referred to as the

15 transaction ID - is allocated in both communication devices of the two signaling nodes involved for the identification of this relationship. After a BEGIN message, in the structured dialog the individual information is transferred with CONTINUE messages. The

20 BEGIN message contains the transaction code of the initiator, the CONTINUE messages contain, depending on the direction of transmission, the code of the initiator or the code of the communication partner as the originating code and the code of the communication

25 partner as the destination code. Once the information has been transmitted, the dialog is ended in the normal way by the END message. Structured dialog is used for example for database inquiries, such as for example in the mobile radio networks or in the IN; all exchanged

30 messages can be identified as belonging to this activity by the transaction code.

SUMMARY OF THE INVENTION

The ~~The object of the~~ invention ~~is~~ **discloses** a waiting

35 procedure in which, with reasonable expenditure and also with a predetermined number of operators, the waiting time of calling subscribers is passed in a more acceptable way than in the case of the known methods.

6

The ~~object~~ **invention** is achieved **in one embodiment** by a method ~~of the type stated at the beginning~~ in which the waiting procedure to which a request is subjected is

5 carried out according to the invention as follows:
an entry is generated as a call-back entry with information which contains a call address concerning the calling subscriber and/or information representing the calling subscriber and is arranged in sequence in a

10 waiting field, the request or a connection arising from it being terminated, and when an operator or a connection line becomes free, at least one of the first ·entries in the waiting field is taken from the waiting field and, on the basis of the information of the at

15 least one entry, a call-back connection is established between the subscriber specified by the call address and the free operator or the free connection line.

~~This solution achieves the stated object in a simple~~

20 ~~way.~~ The calling subscriber can leave his request to use the service without having to "hang on" during the entire waiting time. In addition, the call charges which would arise during this waiting time do not apply.

25

According to ~~an alternative implementational variant~~ **another embodiment** of the method according to the invention, the waiting procedure is carried out as follows:

30 An entry is generated as a call-back entry with information which contains a call address concerning the calling subscriber and/or information representing the calling subscriber and is arranged in sequence in a waiting field, the request or a connection arising from

35 it being terminated.

At least one of the first entries in the waiting field is taken from the waiting field and, on the basis of

the information of the entry, a call-back connection directed at the subscriber specified by the call address is initiated and is possibly maintained. Subsequently, the call-back connection is established between the specified subscriber and a free subscriber or a free connection line.   In this implementational variant, possibly occurring waiting times for the operators are avoided, since the waiting subscriber is called back already before an operator actually becomes free and, if need be, is connected to an announcement. When a suitable operator becomes free, the already called-back subscriber is immediately put through.

In ~~an advantageous~~ **still another** embodiment of the invention, at the beginning of the waiting procedure for the request concerned, an anticipated waiting time is determined and, provided that it lies above a predeterminable lower threshold value, a call-back entry is generated, otherwise the request is arranged in sequence in the waiting field.   This avoids the generation of a call-back in the case of short waiting times, when the subscriber is quite willing to wait.

In addition~~, it may be expedient~~ if, at the beginning of the waiting procedure for the request concerned, an anticipated waiting time is determined and, provided that it lies below a predeterminable upper threshold value, a call-back entry is generated, otherwise the request is denied.   This procedure is useful wherever the waiting time would become so great, for example several hours, that waiting for the call-back would presumably be onerous or pointless for the subscriber.

It is ~~favorable~~ **preferable** if, before terminating the request or the connection arising from it, service-specific instructions are taken from the calling subscriber and used when generating the call-back entry and/or arranging it in sequence.

Service-specific instructions may in this case be, for example, the selection of an operator group, such as for example for a subservice (for example division of the foreign information service into subservices corresponding to geographical areas); they may concern special service features, such as for example a language desired by the subscriber for the services provided or a customer number of the calling subscriber, which could be used for example in the selection of an operator. The instructions may have been provided by the subscriber in a connection arising from the request, for example in an automated inquiry or as a suffix of the service call number dialed by the subscriber.

Furthermore, it is ~~favorable~~ **preferable** if, at the beginning of the waiting procedure, instructions concerning the desired type of waiting procedure are taken from the calling subscriber, and a call-back entry is only generated if these instructions include consent of the subscriber to a call-back connection.

At the same time, to increase operating convenience, it is ~~beneficial~~ **preferable** if the instructions of the calling subscriber are taken in a voice-controlled dialog.

In ~~an expedient~~ **yet another** embodiment of the invention, more flexible handling of the call-back can be achieved if, when an operator becomes free, the first entry in the waiting field is taken from the waiting field, the information of the entry is supplied to the free operator and, on the basis of the information of the entry, the operator calls back the subscriber specified in it. ~~It is immaterial in particular here whether the operator initiates~~ **The operator may initiate** the call-back by pressing a button for example, whereupon the call-back connection

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is established, or the call-back connection is produced automatically by the console, without confirmation by the operator.

5   ~~In a favorable way,~~ **The** instructions originating from the calling subscriber and concerning an operator selection are additionally used when generating the call-back entry, and, when taking an entry, ~~only~~ those entries which include the free operator in their
10   operator selection are considered. The instructions may be taken from the subscriber, for example as mentioned further above, or have been provided as a suffix of the call number dialed by the subscriber.

15   **BRIEF DESCRIPTION OF THE DRAWINGS**
The invention together with further benefits is explained in more detail below on the basis of a non-restrictive exemplary embodiment, which concerns an operator service of a fixed telephone network. Used as
20   a basis for this explanation are the attached figures, which show schematic representations and in which:

~~figure~~ **Figure** 1   shows the switching system for
                 carrying out
25   the operator service with the assigned operators~~,~~.

~~figure~~ **Figure** 2   shows the waiting field of the
                 operator
service~~; and~~.
30

~~figure~~ **Figure** 3   shows a flow diagram of the
                 generation of an
entry of the waiting field.

35   **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**
An exemplary ~~In the case of the~~ switching system OPS **is** shown in figure 1, on which the operator service is operated~~, only the components most important for this~~

10

~~are shown, insofar as they are significant for the invention~~. The consoles of the operators OP1, OP2, OP3 assigned to the operator service OPS and the network subscribers TN1, TN2,...,TNx are connected into the
5 fixed telephone network via subscriber lines and line trunk groups (not represented in the drawing), for example connected as shown to the switching unit KPN of the exchange. In the example, three operators are assigned to the operator service~~; it goes without~~
10 ~~saying that~~. **Of course,** there may be any desired number of operators. Provided for controlling the switching system OPS is a coordination processor COP, which also undertakes the assignment to the operators OP1, OP2, OP3 of the subscribers TNx calling with a service
15 request.

A subscriber TNx wishing to use the operator service OPS requests this service by dialing a service call number which is assigned in the telephone network to
20 the operator service. The request for connection received by the operator service consequently represents a service request. If one of the operators OP1, OP2, OP3 is free, the request is answered by the request for connection being put through by the
25 coordination processor COP to the free operator.

However, **for purposes of this example,** it will be assumed ~~hereafter~~ that all the operators OP1, OP2, OP3 are busy attending to service requests from subscribers
30 - not shown in figure 1. Further service requests therefore cannot be handled immediately~~; instead~~. **Instead**, they are subjected to a waiting procedure by the coordination processor COP. In known systems, for example, a recording, for example with the announcement
35 "please wait", is played to the subscriber, and the request concerned is arranged in sequence in a waiting field WFD, usually at the end of the line created by the waiting field WFD. When an operator becomes free,

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the first request is taken from the waiting field and the subscriber is connected to the free operator.

According to the invention, it is provided that the
5   waiting procedure is carried out on the basis of a request from a subscriber TNx for a (currently) busy operator service OPS as follows: an entry which is generated from call-relevant data of the subscriber TNx is arranged in sequence in the waiting field and the
10 request for connection of the subscriber is terminated. The service request is answered by a separate call-back, which is initiated from the operator system when an operator becomes free on the basis of the call-relevant data in the first entry.
15

Figure 2 shows by way of example a waiting field WFD according to the invention with several entries, which are also referred to hereafter as call-back entries RRE. In the example shown, a call-back entry in each
20 case ~~contains~~ **includes** a call number trn of the subscriber, from the service request of which the call-back entry originates. The call number trn serves as a call address when the subscriber is called back. A second field opw of the entry designates a selection of
25 the desired operators, for example for a desired language, for special subservices or the like. For the sake of simplicity, in figure 2 the operator selections opw in the entries are symbolized by figures, which relate to the number of the operators OP1, OP2, OP3.
30 ~~Further~~ **Additional** information ~~dat contained~~ **data included** in an entry concerns additional data which have been provided by the subscriber on the basis of the operator service used.

35 Referring to the flow diagram of figure 3, if a request received by the operator service OPS as a result of a call of a subscriber TNx cannot be answered because the operators OP1, OP2, OP3 are busy, an automated dialog

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is first conducted with the subscriber, asking the calling subscriber to give service-specific instructions, for example for a subservice desired by the subscriber or desired service features, such as for instance a preferred language. The instructions are stored in a data field dat when an entry is generated and/or used for determining an operator selection opw, which indicates which of the operators OP1, OP2, OP3 is to answer the entry.

The anticipated waiting time before an answer can be given is then determined. This waiting time is determined by a predetermined method of a known type, for example on the basis of how busy the operator service is, in particular the number of requests waiting, and the processing time of previous service requests. If the anticipated waiting time lies below a predeterminable lower threshold value, for example below 2 minutes, the request is held in the known way as a waiting entry WTE in the waiting line, the calling subscriber TNx being informed by means of an automated announcement that his call will be dealt with shortly.

If, however, the anticipated waiting time exceeds the threshold value, a waiting procedure by means of a call-back takes place. A call-back entry RRE is generated using the call number tnx of the subscriber TNx and arranged in sequence in the waiting field WFD. The subscriber then receives an automated announcement that his request has been registered and he will be called back~~, in a favorable way~~. **Preferably**, he may be additionally informed of the anticipated waiting time. The connection is subsequently terminated.

The arrangement in sequence rrh of the call-back entry generally takes place at the end of the waiting field. In special cases, an entry may also be arranged at some other position in the sequence, the position being

determined for example on the basis of the subscriber data and the existing entries of the waiting list. For example, it could be provided that a specific group of callers is given preferential treatment and their

5   requests or call-back entries are therefore arranged in sequence ahead of entries of other callers.

In addition to or instead of the already mentioned lower threshold value t1, a second, upper threshold

10   value t2 may be provided. If the anticipated waiting time lies above the upper threshold value t2, for example over 3 hours, incoming service requests are denied, for example with an announcement which informs the subscriber that the service is busy and asks him to

15   call back at a later time, and the creation of an entry for the waiting field does not occur.

In a variant (not represented in figure 3) of the invention, the decision with respect to the type of

20   waiting procedure can be left to the calling subscriber. For example, the subscriber is informed in a voice-controlled dialog of the position in which he would be waiting in line and/or the probable waiting time and is given the option of waiting in line, being

25   called back or ending the call without any further action.

If one of the operators of the service OPS becomes free, for example the operator OP3, a suitable entry is

30   taken from the waiting field WFD and answered. It may, for example, always be the first entry in the waiting field that is taken ent (figure 2). The waiting field WFD is advantageously searched through, beginning from the first position, for an entry which includes the

35   free operator in its operator selection opw, and this entry is taken and used as a basis for the answer ent'.

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In this example, the first entry with an operator selection which includes the operator OP3 (represented in figure 2 by the figure assigned to this operator, that is 3) is that entry with the call number tn3 of

5 the subscriber TN3. (It is coincidental that the number of the operator is the same as that of the subscriber.) This entry is then taken from the waiting field and the information of the entry is supplied to the free operator OP3. On the basis of this

10 information, the operator calls the subscriber TN3 back, for example by pressing a button on the console, whereby the establishment of a connection is initiated in a known way, and in this way offers the subscriber the desired service. In a variant, the call-back

15 connection may be established automatically by the operator console and provided to the operator together with the information of the call-back entry.

To avoid waiting times for the operators, not only the

20 entry position which is first in the waiting field but also the penultimate entry or a number of entries positioned first in the waiting field are advantageously taken from the waiting field and a call-back connection set up for each of them. Those entries

25 for which the still remaining waiting time within the waiting procedure is expected to be below a predeterminable threshold value, or a predetermined waiting time, are advantageously taken from the waiting field. The called-back subscribers are, for example,

30 played an appropriate announcement, by which the end of the waiting procedure is indicated and the subscriber is switched through as soon as possible to the desired operator or subscriber.

35 The initiation according to the invention of a call-back connection to a specified subscriber as part of a waiting procedure provided in relation to an operator service represents in principle an advantageous

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development of the ISDN-specific "Call Completion on Busy Subscriber" service feature - also referred to as "CCBS" - specified according to the ETSI standard - cf. ETS 300 357 -, which however can be used ~~only~~ for one

5   subscriber line in each case.

The "Call Completion on Busy Subscriber" service feature is one of the most complex service features within ISDN-specific telephone networks. In the case

10   of this service feature, a calling subscriber encountering a busy B subscriber line can have an automatic call-back initiated by the network when this subscriber is free again. In signaling terms, the unsuccessful connection to the B subscriber is

15   initially terminated. In the destination exchange, the call-back request is then entered, it being determined by the destination exchange when the B subscriber is free again or has the free status. The determination of the free status can be achieved for example by

20   regularly checking the switching status of the B subscriber. Alternatively, the transition of the subscriber status from "busy" to "free" may be selected or set as the triggering criterion for the initiation of the call-back. When the free status of the B

25   subscriber is established, it is firstly checked whether the A subscriber is likewise free, then the latter is called and after that a connection to the B subscriber is set up. The handling of the service feature - i.e. the checking of the B subscriber and the

30   notification of the A subscriber - takes place as an end-to-end signaling between the two subscriber exchanges. The control of the service feature is supported for this on the SCCP end-to-end signaling connections and uses a TCAP-based dialog for the

35   exchange of the end-to-end signaling data.

The method according to the invention represents a further development of the CCBS standard, the same

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procedures as CCBS being used for the signaling of the call-back information from the B subscriber to the A subscriber - i.e. the setting up of SCCP end-to-end signaling connections and exchange of end-to-end

5 signaling data by means of TCAP dialog. By contrast with CCBS, other triggering criteria can be used in the case of the method according to the invention. With the aid of the method according to the invention, call-back connections can be created as part of a waiting

10 procedure, it being possible to use for example the finding that the waiting time within a waiting line is less than expected as a triggering criterion for the initiation of a call-back connection. A service feature created in this way, i.e. initiation of a call-

15 back to a specified subscriber if a waiting time is less than that predetermined, can also be referred to as "Call Completion on Dequeuing" or "CCDQ".

The method according to the invention may be used

20 advantageously in the case of subscriber lines or connection lines arranged network-wide within a telephone network and combined to form a subscriber group. The subscriber group may be connected via a predetermined number of connection lines or

25 transmission channels - for example via a private branch exchange - to the public telecommunication network.

Description

Processing a request to an operator service

5   The invention relates to a method of processing
requests directed to an operator service of a
telecommunication network which are respectively
received in the form of a request for connection from a
calling subscriber of the network for the operator
10   service, the operator service being assigned a
predetermined number of operators and/or connection
lines, in which method a received request is subjected
to a waiting procedure on the part of the operator
service if all the suitable operators or connection
15   lines for this request are busy.

In telecommunication networks, in particular in
telephone networks, what are known as operator services
are provided, often representing an important link
20   between the customers of the network and the network
operators. The tasks of such an operator service are
many and varied; a main task, for example, is to
provide the subscribers with information on request. A
subscriber wishing to use an operator service requests
25   in the telecommunication network concerned the setting
up of a connection to the operator service, for example
in a telephone network in the form of a call by means
of a service number assigned to the operator service;
on the part of the operator service, the request for
30   connection is accepted and the desired service is
provided for the calling subscriber.

Also known in current communication networks or
telephone networks, along with the connection of
35   private branch exchanges to public exchanges, is the
interconnection of a number of subscriber lines
arranged int the telephone network to form a subscriber
group, for example performing the function of an

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operator service - also known as a "hunting group". A hunting group is assigned a group call number or pilot call number, which is shared by all the interconnected subscriber lines, and, after it has been dialed - for

5 example for the setting up of a communication link to one of the communication devices assigned to the group - a free subscriber line within the group is determined with the aid of a defined search method - also referred to as a "hunting algorithm" - for setting up the

10 connection.

For example, a subscriber may call an operator service in an ISDN network in order to request information and a connection concerning another subscriber. The

15 subscriber is assigned to a free operator and obtains from the latter the requested service, for example the desired information. The responsible operator can then, if necessary, access a database for example, the operator then being provided on the screen of his PC

20 with information concerning the other subscriber. If also desired, the operator can set up a connection with the desired subscriber and put the latter through to the calling subscriber. The example just described is intended to represent only one of the possibilities or

25 tasks of an operator service.

A system for carrying out an operator service comprises not only a central control system but also the assigned operators. The control system and the operators are

30 usually stationed at 'call centers', as they are known, and their respective equipment, comprising a terminal, PC, screen etc. and referred to usually and hereafter as a "console", is directly connected to the system, or can be connected to it. For example, a call center may

35 be established as part of one of the applicant's EWSD switching systems, the operators being connected as network subscribers. Another known embodiments of a call center is set up for example in the central

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station of a branch exchange, the operators or the subscribers assigned to the operator service being reachable via extensions. The branch exchanges are connected via a predetermined number of connection
5   lines or transmission channels to the higher-level or public communication network.

Since the number of operators of a given operator service is limited, in particular for reasons of
10   economy, there is often the situation - in particular at peak times - that all the available operators are already busy attending to calling subscribers and consequently, when a further subscriber calls for the operator service, no operator is free to take the call.
15   Since in such a case the request is usually not to be handled like a request for connection to a busy line - that is rejection with a busy signal of the telecommunication network -, a waiting procedure is provided for the request received.
20

A known and widely customary method for a waiting procedure, in particular in the case of telephone services, consists in that the request or the call is made to wait in line; the calls waiting in line are
25   taken by operators one after the other. The calling subscriber must remain on the phone for the entire time until his call is taken. Owing to long waiting times, the call is often terminated prematurely by the - irritated - subscriber; this may lead to a lack of
30   acceptance of the service and, as a consequence, to actual dissatisfaction on the part of the customers with the operator of the service.

Another attempted solution is to reduce the waiting
35   time at especially busy times by assigning further operators to the service concerned for a short time. However, apart from the associated administrative effort, this solution requires in principle that an

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adequately large number of operator personnel are
available.

Within current telephone networks, the signaling for
5   setting up and clearing down 64 kbit user information
connections for controlling ISDN services takes place
on the basis of the ITU-T Signaling System No. 7 - also
referred to as SS No. 7.

10   The actual task of the Signaling System No. 7 is to
exchange signaling messages within the communication
networks. The signaling messages are exchanged by the
user parts within the reference model. According to
the type of signaling messages, a distinction is made,
15   for example, between the Telephone User Part - TUP -,
the Data User Part - DUP -, the ISDN User Part - ISUP -
and the Broadband ISDN User Part - B-ISUP. The TUP was
implemented as the first application in the Signaling
System No. 7. Building on the TUP, the ISUP was
20   defined for generally establishing the ISDN and for
establishing the signaling within the ISDN. The ISUP
gave rise to the latest application of the B-ISUP for
applications within ATM-based networks. The main tasks
of the ISUP are:
25

- setting up and clearing down user information
  connections,
- performing the signaling for service attributes,
- coupling two "logical" signaling connections (for
30   example at the transition from the national network
  to the international network).

The ISDN user part directly uses the Message Transfer
Part - MTP - and the Signaling Connection and Control
35   Part - SCCP, layer 4; the ISUP itself is consequently
to be classified as belonging to layers 4 to 7 in the
OSI reference model. The ISDN user part controls both
the link-by-link signaling to reach the destination and

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the end-to-end signaling relationship between the originating exchange and the destination exchange. With the aid of the link-by-link signaling, the path for the user information connection and the signaling
5   connection is sought and, after corresponding commands, is set up. The MTP is used for this purpose. For the user information connection, all the involved exchanges must be informed, for example by switching through the user ·information channel, while only the originating
10   and destination exchanges exchange signaling information for the control of the service attributes. For the end-to-end signaling, the ISUP uses the services of the SCCP. In the ISDN user part, the actual signaling information is exchanged. All the
15   lower-level layers ensure ·that this information is transmitted in an acknowledged form and reaches the addressed user part. For the exchange of the end-to-end signaling messages for handling ISDN service attributes, the end-to-end signaling of the SCCP is
20   used, based on a TCAP dialog.

For more complex applications within communication networks, such as for example for supporting database inquiries pertaining to services of the Intelligent
25   Network - also referred to as IN - or in the case of mobile radio applications, the Transaction Capabilities Application Part - TCAP - was introduced into the Signaling System No. 7. For example, with the freephone service of the Intelligent Network, the
30   initiator of the connection dials an IN call number (0130 or 0800), which, by calling up the Intelligent Network, determines a destination call number on the basis of the customer parameters. For determining the valid destination call number, only signaling messages
35   have to be exchanged; the user information channel is not connected to the IN. This service call is an example of a typical TCAP application. In the communication of TCAP entities, a distinction is made

between structured dialog and unstructured dialog. In the case of structured transport, before messages are exchanged, a transaction relationship is initiated and the transaction code - also referred to as the transaction ID - is allocated in both communication devices of the two signaling nodes involved for the identification of this relationship. After a BEGIN message, in the structured dialog the individual information is transferred with CONTINUE messages. The BEGIN message contains the transaction code of the initiator, the CONTINUE messages contain, depending on the direction of transmission, the code of the initiator or the code of the communication partner as the originating code and the code of the communication partner as the destination code. Once the information has been transmitted, the dialog is ended in the normal way by the END message. Structured dialog is used for example for database inquiries, such as for example in the mobile radio networks or in the IN; all exchanged messages can be identified as belonging to this activity by the transaction code.

The object of the invention is a waiting procedure in which, with reasonable expenditure and also with a predetermined number of operators, the waiting time of calling subscribers is passed in a more acceptable way than in the case of the known methods.

The object is achieved by a method of the type stated at the beginning in which the waiting procedure to which a request is subjected is carried out according to the invention as follows:
an entry is generated as a call-back entry with information which contains a call address concerning the calling subscriber and/or information representing the calling subscriber and is arranged in sequence in a waiting field, the request or a connection arising from it being terminated, and when an operator or a

connection line becomes free, at least one of the first
entries in the waiting field is taken from the waiting
field and, on the basis of the information of the at
least one entry, a call-back connection is established
5   between the subscriber specified by the call address
and the free operator or the free connection line.

This solution achieves the stated object in a simple
way. The calling subscriber can leave his request to
10   use the service without having to "hang on" during the
entire waiting time. In addition, the call charges
which would arise during this waiting time do not
apply.

15   According to an alternative implementational variant of
the method according to the invention, the waiting
procedure is carried out as follows:
An entry is generated as a call-back entry with
information which contains a call address concerning
20   the calling subscriber and/or information representing
the calling subscriber and is arranged in sequence in a
waiting field, the request or a connection arising from
it being terminated.

25   At least one of the first entries in the waiting field
is taken from the waiting field and, on the basis of
the information of the entry, a call-back connection
directed at the subscriber specified by the call
address is initiated and is possibly maintained.
30   Subsequently, the call-back connection is established
between the specified subscriber and a free subscriber
or a free connection line. In this implementational
variant, possibly occurring waiting times for the
operators are avoided, since the waiting subscriber is
35   called back already before an operator actually becomes
free and, if need be, is connected to an announcement.
When a suitable operator becomes free, the already
called-back subscriber is immediately put through.

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In an advantageous embodiment of the invention, at the beginning of the waiting procedure for the request concerned, an anticipated waiting time is determined and, provided that it lies above a predeterminable lower threshold value, a call-back entry is generated, otherwise the request is arranged in sequence in the waiting field. This avoids the generation of a call-back in the case of short waiting times, when the subscriber is quite willing to wait.

In addition, it may be expedient if, at the beginning of the waiting procedure for the request concerned, an anticipated waiting time is determined and, provided that it lies below a predeterminable upper threshold value, a call-back entry is generated, otherwise the request is denied. This procedure is useful wherever the waiting time would become so great, for example several hours, that waiting for the call-back would presumably be onerous or pointless for the subscriber.

It is favorable if, before terminating the request or the connection arising from it, service-specific instructions are taken from the calling subscriber and used when generating the call-back entry and/or arranging it in sequence.
Service-specific instructions may in this case be, for example, the selection of an operator group, such as for example for a subservice (for example division of the foreign information service into subservices corresponding to geographical areas); they may concern special service features, such as for example a language desired by the subscriber for the services provided or a customer number of the calling subscriber, which could be used for example in the selection of an operator. The instructions may have been provided by the subscriber in a connection arising from the request, for example in an automated inquiry

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or as a suffix of the service call number dialed by the subscriber.

Furthermore, it is favorable if, at the beginning of
5 the waiting procedure, instructions concerning the desired type of waiting procedure are taken from the calling subscriber, and a call-back entry is only generated if these instructions include consent of the subscriber to a call-back connection.
10

At the same time, to increase operating convenience, it is beneficial if the instructions of the calling subscriber are taken in a voice-controlled dialog.

15 In an expedient embodiment of the invention, more flexible handling of the call-back can be achieved if, when an operator becomes free, the first entry in the waiting field is taken from the waiting field, the information of the entry is supplied to the free
20 operator and, on the basis of the information of the entry, the operator calls back the subscriber specified in it. It is immaterial in particular here whether the operator initiates the call-back by pressing a button for example, whereupon the call-back connection is
25 established, or the call-back connection is produced automatically by the console, without confirmation by the operator.

In a favorable way, instructions originating from the
30 calling subscriber and concerning an operator selection are additionally used when generating the call-back entry, and, when taking an entry, only those entries which include the free operator in their operator selection are considered. The instructions may be
35 taken from the subscriber, for example as mentioned further above, or have been provided as a suffix of the call number dialed by the subscriber.

The invention together with further benefits is explained in more detail below on the basis of a non-restrictive exemplary embodiment, which concerns an operator service of a fixed telephone network. Used as
5   a basis for this explanation are the attached figures, which show schematic representations and in which:

figure 1   shows the switching system for carrying out the operator service with the assigned
10   operators;

figure 2   shows the waiting field of the operator service; and

15 figure 3   shows a flow diagram of the generation of an entry of the waiting field.

In the case of the switching system OPS shown in figure 1, on which the operator service is operated, only the
20 components most important for this are shown, insofar as they are significant for the invention. The consoles of the operators OP1, OP2, OP3 assigned to the operator service OPS and the network subscribers TN1, TN2,...,TNx are connected into the fixed telephone
25 network via subscriber lines and line trunk groups (not represented in the drawing), for example connected as shown to the switching unit KPN of the exchange. In the example, three operators are assigned to the operator service; it goes without saying that there may
30 be any desired number of operators. Provided for controlling the switching system OPS is a coordination processor COP, which also undertakes the assignment to the operators OP1, OP2, OP3 of the subscribers TNx calling with a service request.
35

A subscriber TNx wishing to use the operator service OPS requests this service by dialing a service call number which is assigned in the telephone network to

the operator service. The request for connection received by the operator service consequently represents a service request. If one of the operators OP1, OP2, OP3 is free, the request is answered by the

5   request for connection being put through by the coordination processor COP to the free operator.

However, it will be assumed hereafter that all the operators OP1, OP2, OP3 are busy attending to service

10   requests from subscribers - not shown in figure 1. Further service requests therefore cannot be handled immediately; instead, they are subjected to a waiting procedure by the coordination processor COP. In known systems, for example, a recording, for example with the

15   announcement "please wait", is played to the subscriber, and the request concerned is arranged in sequence in a waiting field WFD, usually at the end of the line created by the waiting field WFD. When an operator becomes free, the first request is taken from

20   the waiting field and the subscriber is connected to the free operator.

According to the invention, it is provided that the waiting procedure is carried out on the basis of a

25   request from a subscriber TNx for a (currently) busy operator service OPS as follows: an entry which is generated from call-relevant data of the subscriber TNx is arranged in sequence in the waiting field and the request for connection of the subscriber is terminated.

30   The service request is answered by a separate call-back, which is initiated from the operator system when an operator becomes free on the basis of the call-relevant data in the first entry.

35   Figure 2 shows by way of example a waiting field WFD according to the invention with several entries, which are also referred to hereafter as call-back entries RRE. In the example shown, a call-back entry in each

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case contains a call number trn of the subscriber, from
the service request of which the call-back entry
originates. The call number trn serves as a call
address when the subscriber is called back. A second
5 field opw of the entry designates a selection of the
desired operators, for example for a desired language,
for special subservices or the like. For the sake of
simplicity, in figure 2 the operator selections opw in
the entries are symbolized by figures, which relate to
10 the number of the operators OP1, OP2, OP3. Further
information dat contained in an entry concerns
additional data which have been provided by the
subscriber on the basis of the operator service used.

15 Referring to the flow diagram of figure 3, if a request
received by the operator service OPS as a result of a
call of a subscriber TNx cannot be answered because the
operators OP1, OP2, OP3 are busy, an automated dialog
is first conducted with the subscriber, asking the
20 calling subscriber to give service-specific
instructions, for example for a subservice desired by
the subscriber or desired service features, such as for
instance a preferred language. The instructions are
stored in a data field dat when an entry is generated
25 and/or used for determining an operator selection opw,
which indicates which of the operators OP1, OP2, OP3 is
to answer the entry.

The anticipated waiting time before an answer can be
30 given is then determined. This waiting time is
determined by a predetermined method of a known type,
for example on the basis of how busy the operator
service is, in particular the number of requests
waiting, and the processing time of previous service
35 requests. If the anticipated waiting time lies below a
predeterminable lower threshold value, for example
below 2 minutes, the request is held in the known way
as a waiting entry WTE in the waiting line, the calling

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subscriber TNx being informed by means of an automated announcement that his call will be dealt with shortly.

5   If, however, the anticipated waiting time exceeds the threshold value, a waiting procedure by means of a call-back takes place.   A call-back entry RRE is generated using the call number tnx of the subscriber TNx and arranged in sequence in the waiting field WFD. The subscriber then receives an automated announcement

10   that his request has been registered and he will be called back; in a favorable way, he may be additionally informed of the anticipated waiting time.   The connection is subsequently terminated.

15   The arrangement in sequence rrh of the call-back entry generally takes place at the end of the waiting field. In special cases, an entry may also be arranged at some other position in the sequence, the position being determined for example on the basis of the subscriber

20   data and the existing entries of the waiting list. For example, it could be provided that a specific group of callers is given preferential treatment and their requests or call-back entries are therefore arranged in sequence ahead of entries of other callers.

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In addition to or instead of the already mentioned lower threshold value t1, a second, upper threshold value t2 may be provided.   If the anticipated waiting time lies above the upper threshold value t2, for

30   example over 3 hours, incoming service requests are denied, for example with an announcement which informs the subscriber that the service is busy and asks him to call back at a later time, and the creation of an entry for the waiting field does not occur.

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In a variant (not represented in figure 3) of the invention, the decision with respect to the type of waiting procedure can be left to the calling

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subscriber. For example, the subscriber is informed in a voice-controlled dialog of the position in which he would be waiting in line and/or the probable waiting time and is given the option of waiting in line, being
5   called back or ending the call without any further action.

If one of the operators of the service OPS becomes free, for example the operator OP3, a suitable entry is
10   taken from the waiting field WFD and answered. It may, for example, always be the first entry in the waiting field that is taken ent (figure 2). The waiting field WFD is advantageously searched through, beginning from the first position, for an entry which includes the
15   free operator in its operator selection opw, and this entry is taken and used as a basis for the answer ent'.

In this example, the first entry with an operator selection which includes the operator OP3 (represented
20   in figure 2 by the figure assigned to this operator, that is 3) is that entry with the call number tn3 of the subscriber TN3. (It is coincidental that the number of the operator is the same as that of the subscriber.) This entry is then taken from the waiting
25   field and the information of the entry is supplied to the free operator OP3. On the basis of this information, the operator calls the subscriber TN3 back, for example by pressing a button on the console, whereby the establishment of a connection is initiated
30   in a known way, and in this way offers the subscriber the desired service. In a variant, the call-back connection may be established automatically by the operator console and provided to the operator together with the information of the call-back entry.
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To avoid waiting times for the operators, not only the entry position which is first in the waiting field but also the penultimate entry or a number of entries

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positioned first in the waiting field are advantageously taken from the waiting field and a call-back connection set up for each of them. Those entries for which the still remaining waiting time within the

5 waiting procedure is expected to be below a predeterminable threshold value, or a predetermined waiting time, are advantageously taken from the waiting field. The called-back subscribers are, for example, played an appropriate announcement, by which the end of

10 the waiting procedure is indicated and the subscriber is switched through as soon as possible to the desired operator or subscriber.

The initiation according to the invention of a call-

15 back connection to a specified subscriber as part of a waiting procedure provided in relation to an operator service represents in principle an advantageous development of the ISDN-specific "Call Completion on Busy Subscriber" service feature - also referred to as

20 "CCBS" - specified according to the ETSI standard - cf. ETS 300 357 -, which however can be used only for one subscriber line in each case.

The "Call Completion on Busy Subscriber" service

25 feature is one of the most complex service features within ISDN-specific telephone networks. In the case of this service feature, a calling subscriber encountering a busy B subscriber line can have an automatic call-back initiated by the network when this

30 subscriber is free again. In signaling terms, the unsuccessful connection to the B subscriber is initially terminated. In the destination exchange, the call-back request is then entered, it being determined by the destination exchange when the B subscriber is

35 free again or has the free status. The determination of the free status can be achieved for example by regularly checking the switching status of the B subscriber. Alternatively, the transition of the

subscriber status from "busy" to "free" may be selected
or set as the triggering criterion for the initiation
of the call-back. When the free status of the B
subscriber is established, it is firstly checked
5 whether the A subscriber is likewise free, then the
latter is called and after that a connection to the B
subscriber is set up. The handling of the service
feature - i.e. the checking of the B subscriber and the
notification of the A subscriber - takes place as an
10 end-to-end signaling between the two subscriber
exchanges. The control of the service feature is
supported for this on the SCCP end-to-end signaling
connections and uses a TCAP-based dialog for the
exchange of the end-to-end signaling data.

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The method according to the invention represents a
further development of the CCBS standard, the same
procedures as CCBS being used for the signaling of the
call-back information from the B subscriber to the A
20 subscriber - i.e. the setting up of SCCP end-to-end
signaling connections and exchange of end-to-end
signaling data by means of TCAP dialog. By contrast
with CCBS, other triggering criteria can be used in the
case of the method according to the invention. With
25 the aid of the method according to the invention, call-
back connections can be created as part of a waiting
procedure, it being possible to use for example the
finding that the waiting time within a waiting line is
less than expected as a triggering criterion for the
30 initiation of a call-back connection. A service
feature created in this way, i.e. initiation of a call-
back to a specified subscriber if a waiting time is
less than that predetermined, can also be referred to
as "Call Completion on Dequeuing" or "CCDQ".

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The method according to the invention may be used
advantageously in the case of subscriber lines or
connection lines arranged network-wide within a

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telephone network and combined to form a subscriber group. The subscriber group may be connected via a predetermined number of connection lines or transmission channels - for example via a private

5   branch exchange - to the public telecommunication network.

Patent claims

1. A method of processing requests directed to an
    operator service (OPS) of a telecommunication
    network which are respectively received in the form
    of a request for connection from a calling
    subscriber (TN1-TNx) of the network for the
    operator service, the operator service (OPS) being
    assigned a predetermined number of operators (OP1,
    OP2, OP3) and/or connection lines, in which method
    a received request is subjected to a waiting
    procedure on the part of the operator service if
    all the suitable operators or connection lines for
    this request are busy, characterized in that the
    waiting procedure to which a request is subjected
    is carried out as follows:
    an entry is generated as a call-back entry (RRE)
    with information which contains a call address
    (trn) concerning the calling subscriber and/or
    information representing the calling subscriber and
    is arranged in sequence in a waiting field (WFD),
    the request or a connection arising from it being
    terminated, and
    when an operator or a connection line becomes free,
    at least one of the first entries (ent) in the
    waiting field (WFD) is taken from the waiting field
    and, on the basis of the information of the at
    least one entry, a call-back connection is
    established between the subscriber specified by the
    call address (trn) and the free operator or the
    free connection line.

2. A method of processing requests directed to an
    operator service (OPS) of a telecommunication
    network which are respectively received in the form
    of a request for connection from a calling
    subscriber (TN1-TNx) of the network for the
    operator service, the operator service (OPS) being

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assigned a predetermined number of operators (OP1, OP2, OP3) and/or connection lines, in which method a received request is subjected to a waiting procedure on the part of the operator service if all the suitable operators or connection lines for this request are busy, characterized in that the waiting procedure to which a request is subjected is carried out as follows:

an entry is generated as a call-back entry (RRE) with information which contains a call address (trn) concerning the calling subscriber and/or information representing the calling subscriber and is arranged in sequence in a waiting field (WFD), the request or a connection arising from it being terminated, and

in that at least one of the first entries (ent) in the waiting field (WFD) is taken from the waiting field and, on the basis of the information of the entry, a call-back connection directed at the subscriber specified by the call address (trn) is initiated and is possibly maintained, and

in that the call-back connection is established between the specified subscriber and a free operator or a free connection line.

3. The method as claimed in claim 1 or 2, characterized in that, at the beginning of the waiting procedure for the request concerned, an anticipated waiting time is determined and, provided that it lies above a predeterminable lower threshold value (t1), a call-back entry (RRE) is generated, otherwise the request (WTE) is arranged in sequence in the waiting field.

4. The method as claimed in one of claims 1 to 3, characterized in that, at the beginning of the waiting procedure for the request concerned, an anticipated waiting time is determined and,

provided that it lies below a predeterminable upper
threshold value (t2), a call-back entry (RRE) is
generated, otherwise the request is denied.

5. The method as claimed in one of claims 1 to 4, characterized in that, before terminating the request or the connection arising from it, service-specific instructions (opw, dat) are taken from the calling subscriber and used when generating the call-back entry and/or arranging it in sequence.

6. The method as claimed in one of claims 1 to 5, characterized in that, at the beginning of the waiting procedure, instructions concerning the desired type of waiting procedure are taken from the calling subscriber, and a call-back entry (RRE) is only generated if these instructions include consent of the subscriber to a call-back connection.

7. The method as claimed in claim 5 or 6, characterized in that the instructions of the calling subscriber are taken in a voice-controlled dialog.

8. The method as claimed in one of claims 1 to 7, characterized in that, when an operator or a connection line becomes free, at least one of the first entries in the waiting field is taken from the waiting field, the information of the at least one entry is supplied to the free operator and, on the basis of the information of the entry, the operator calls back the subscriber specified in it.

9. The method as claimed in one of claims 1 to 8, characterized in that instructions (opw) originating from the calling subscriber and concerning an operator selection are used when generating the call-back entry (RRE), and in that, when taking an entry, only those entries (ent') which include the free operator in their operator selection are considered.

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10. The method as claimed in one of the preceding claims, characterized in that at least one of those entries for which the still remaining waiting time in the waiting field is expected to be below a predeterminable threshold value, or a predeterminable waiting time, is taken from the waiting field and a call-back connection is initiated.

11. The method as claimed in one of the preceding claims, characterized in that the information representing that an operator or a connection line has become free is transmitted in the direction of the specified subscriber with the aid of the Transaction Capabilities Part Protocol (TCAP), on the basis of the Signaling System No. 7, the initiation of the call-back connection taking place on the side of the specified subscriber.

12. The method as claimed in one of the preceding claims, characterized in that the operator service is formed by a number of subscriber lines arranged in the telecommunication network and combined to form a subscriber group.

13. The method as claimed in claim 12, characterized in that the subscriber group is connected via a predetermined number of connection lines or connection channels to the telecommunication network.

Abstract

Processing a request to an operator service

In the event that all suitable operators or connection lines of an operator service of a telecommunication network are busy when a subscriber request (call) is made to said service, a call-back entry (RRE) with information containing a call address (trn) of the subscriber is generated and arranged in sequence in a waiting field (WFD); the request or the associated connection is terminated.   When an operator or a connection line becomes free, at least one of the first entries (ent, ent') in the waiting field is taken and, on the basis of the information of the entry, a call-back connection is established between the subscriber and the free operator.
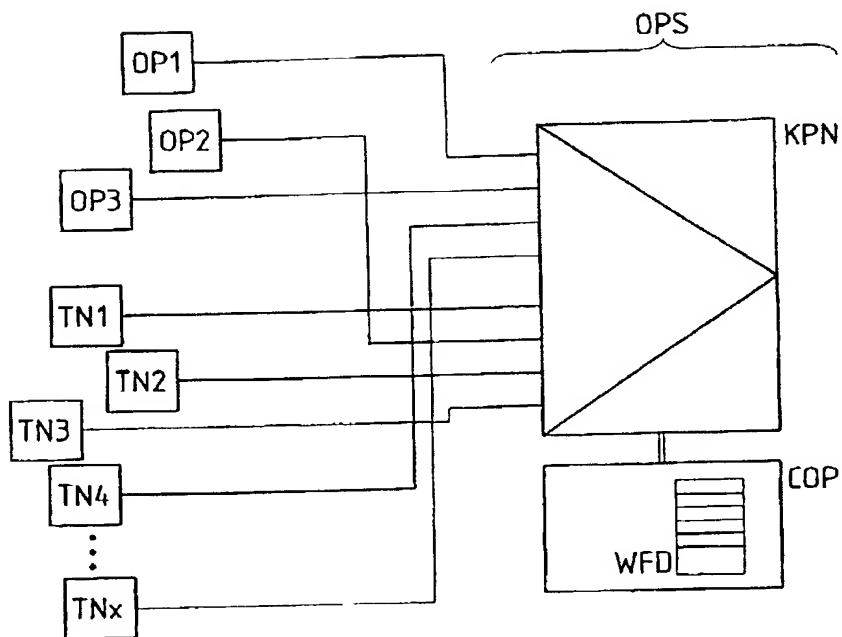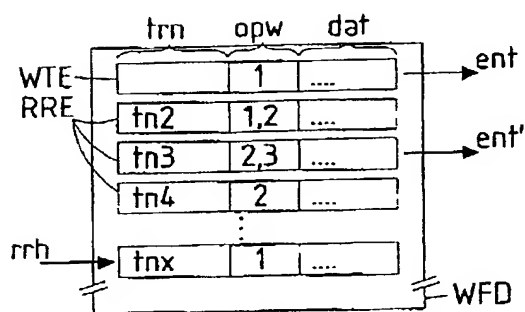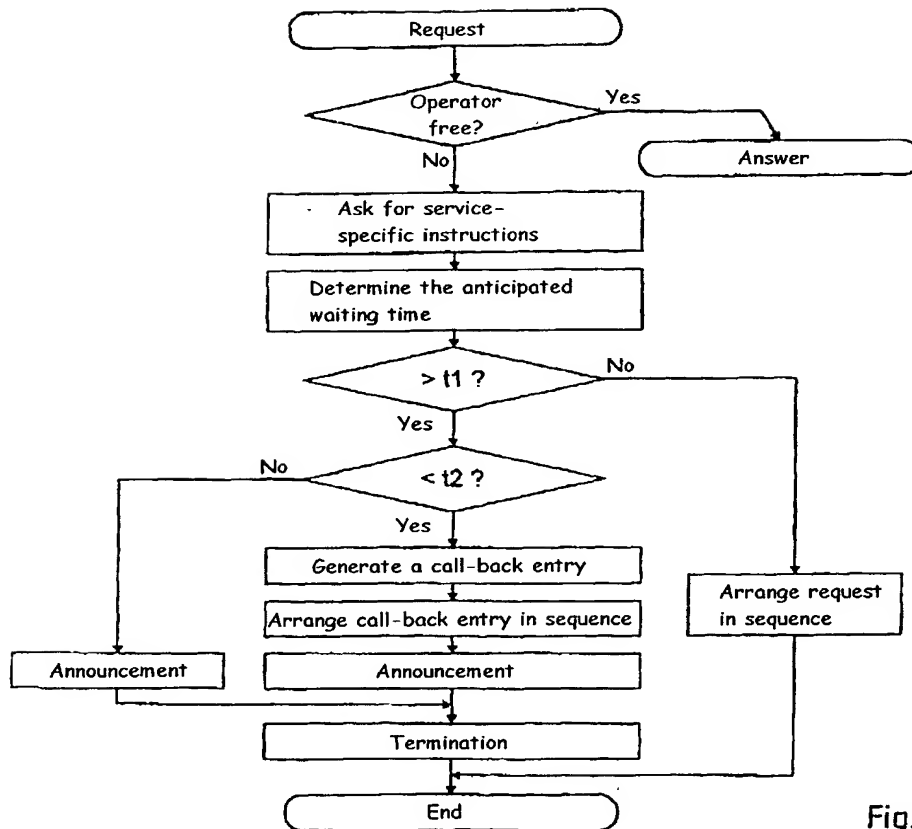
Figure 2

Fig. 1

Fig. 2

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Fig. 3

Declaration and Power of Attorney For Patent Application
Erklärung Für Patentanmeldungen Mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

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Bearbeitung einer Anforderung an ein Operatorservice

deren Beschreibung

(zutreffendes ankreuzen)
☐ hier beigefügt ist.
☒ am __28.06.2000__ als
PCT internationale Anmeldung
PCT Anmeldungsnummer __PCT/DE00/02102__
eingereicht wurde und am _____
abgeändert wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Processing a request to an operator service

the specification of which

(check one)
☐ is attached hereto.
☒ was filed on __28.06.2000__ as
PCT international application
PCT Application No. __PCT/DE00/02102__
and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

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IDNR: 2590 / V: 99-1.00 / B:Val

German Language Declaration

Prior foreign appplications
Priorität beansprucht

<u>Priority Claimed</u>

<u>19929756.8</u>   <u>DE</u>   ˙<u>29.06.1999</u>   ☒   ☐
(Number)   (Country)   (Day Month Year Filed)   Yes   No
(Nummer)   (Land)   (Tag Monat Jahr eingereicht)   Ja   Nein

                                                         ☐   ☐
(Number)   ⁻(Country)   (Day Month Year Filed)   Yes   No
(Nummer)   (Land)   (Tag Monat Jahr eingereicht)   Ja   Nein

                                                         ☐   ☐
(Number)   ⁻(Country)   (Day Month Year Filed)   Yes   No
(Nummer)   (Land)   (Tag Monat Jahr eingereicht)   Ja   Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivil-prozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmel-dungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

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<u>PCT/DE00/02102</u>   <u>28.06.2000</u>   <u>anhängig</u>   <u>pending</u>
(Application Serial No.)   (Filing Date D, M, Y)   (Status)   (Status)
(Anmeldeseriennummer)   (Anmeldedatum T, M, J) (patentiert, anhängig, (patented, pending,
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Ich erkläre hiermit, dass alle von mir in der vorliegen-den Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklä-rung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gül-tigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

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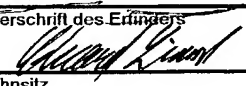Telephone: (001) 202 887 1500 and Facsimile (001) 202 887 0763
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Page 3

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Unterschrift des Erfinders Datum 25/01/2002	Inventor's signature Date
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Postanschrift	Post Office Address
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Unterschrift des Erfinders Datum	Inventor's signature Date
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